A Report
on
The Study of Vegetable Markets
in context of Kathmandu Metropolitan City

Prepared by RECPHEC

Date: November 2016
TABLE OF CONTENTS

1 Introduction .................................................................................................................1
  1.1 Rationale:..................................................................................................................2
  1.2 Objectives: ...............................................................................................................4
  1.3 Study Methodology: ..............................................................................................4
    1.3.1 Preliminary Data Collection: ..............................................................................4
    1.3.2 Reconnaissance Survey: ......................................................................................4
    1.3.3 Field Investigation and Visual Survey: .................................................................4
    1.3.4 Data Analysis: .....................................................................................................5
    1.3.5 Conclusion and Recommendations: ....................................................................5
  1.4 Scope and Limitations of the Study: .................................................................5

2 Literature Review: ....................................................................................................6
  2.1 Policy: .....................................................................................................................6
  2.2 Policy Framework: ...............................................................................................6
  2.3 Organizations to be involved: ................................................................................7
  2.4 Marketing Channels: ............................................................................................7
    2.4.1 Rural Primary Markets: ....................................................................................8
    2.4.2 Assembly Markets: ..........................................................................................8
    2.4.3 Wholesale Markets: .......................................................................................8
    2.4.4 Retail Markets: ................................................................................................8
    2.4.5 Other Marketing Channels: .............................................................................8
  2.5 Market infrastructures: ........................................................................................9
    2.5.1 Site Location: ....................................................................................................9
    2.5.2 Internal Traffic Flows and Congestion: ............................................................9
    2.5.3 Market Lay-out: ................................................................................................10
    2.5.4 Space Utilization in Markets: .........................................................................10
    2.5.5 Estimating overall supply, demand and consumption.................................11
    2.5.6 Site size: ..........................................................................................................12
  2.6 Desirable Market Characteristics: ........................................................................12
  2.7 Social and environmental impact of marketing projects: ................................12
  2.8 Defects in the Market System: .............................................................................13
    2.8.1 Physical aspects: ............................................................................................13
    2.8.2 Social and managerial aspects: .......................................................................13
  2.9 Market Information System: ................................................................................14
    2.9.1 Market Information System in context of Nepal: .................................................14
  2.10 Vegetable and Fruit Wastes: ...............................................................................15
    2.10.1 Waste Reuse and Recycle: .............................................................................16
  2.11 Inference: ..............................................................................................................17

3 Vegetable Market in Local Context: .................................................................18
  3.1 Vegetable Sector in the Context of Nepal: .........................................................18
  3.2 Vegetable Market in the Context of Kathmandu: ...........................................19
  3.3 Semi-permanent Vegetable Market: .................................................................21
    3.3.1 Linkages with permanent vegetable market: .................................................21
    3.3.2 Linkages with social and cultural aspects of the people: ...............................22
3.3.3 Importance in urban planning aspects ................................................................. 22
3.3.4 Case Study of Asan as a semi-permanent vegetable market: ......................... 23

3.4 Permanent Vegetable Market: .............................................................................. 25
3.4.1 Case Study of Kalimati Fruits and Vegetable Market as a Permanent Vegetable Market: ........................................................................................................... 25

4 Observations and Analysis: ..................................................................................... 32
4.1 Issues related with vegetable market: ................................................................. 32
  4.1.1 Solid Waste Management: ................................................................................ 32
  4.1.2 Environmental Pollution: .................................................................................. 34
  4.1.3 Physical Aspects: ............................................................................................... 34
  4.1.4 Traffic Congestion: ........................................................................................... 36
  4.1.5 Management Issues: .......................................................................................... 36
  4.1.6 Macro level Planning: ........................................................................................ 38

4.2 Key Stakeholders: ................................................................................................. 39

5 Conclusion and Recommendations: ....................................................................... 42
5.1 Conclusion: .............................................................................................................. 42
5.2 Recommendations and Policies: .......................................................................... 42
  5.2.1 Macro Level Planning: ....................................................................................... 42
  5.2.2 Physical Aspects: ................................................................................................ 43
  5.2.3 Social Aspects and Managerial Aspects: ............................................................. 44
  5.2.4 Social Security Aspects: ..................................................................................... 45
  5.2.5 Environmental Aspects: ..................................................................................... 46

6 WAY AHEAD

7 References: ................................................................................................................ 47
1 Introduction

The term public market has changed in meaning over time and still differs from place to place. In the United States, a public market has traditionally been defined as a municipally owned and operated building where vendors sell fresh food from open stalls. They typically focus on the sale of a full array of fresh, healthful, value added, and prepared foods – often locally grown or produced. They usually include a seasonal, outdoor farmer’s market component.

Public markets are located in and/or create a public space in the community. This is the visible aspect of a market – the creation of an inviting, safe, and lively place that attracts a wide range of people. As an effective place where people mix, public markets can become the heart and soul of a community, its common ground, a place where people interact easily, and a setting where other community activities take place.

In case of Nepal, public market refers to vegetable markets, which offer fresh fruits and vegetables. Basically these markets can be permanent, semi-permanent (morning-evening shift) and mobile vendor (source: RECPHEC, Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City). The study will focus mainly on permanent vegetable markets and semi-permanent vegetable markets of Kathmandu Metropolitan City.

In case of Kathmandu, “Permanent markets have fixed locations and include many vendors under one roof. Vendors are required to pay rental fees for the area they occupy. They have hoarding boards, or formal signs, that identify the name of the market. Permanent markets are typically open throughout the day. These markets sell all types of fruit and vegetables. These markets act as a wholesale market for vegetable and fruits with small vendors purchasing from these markets for their business. Generally the public purchases food at these permanent markets for larger meals prepared at feast and festival times” (source: RECPHEC, Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City). However, semi-permanent
(morning/ evening) markets have no specified area of permanent structure; and they usually occupy parts of rights-of-way or spaces adjacent to temples, hence most of them are not required to pay rent. These markets provide variety of fresh seasonal vegetables and fruits (source: RECPHEC, Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City). In this report, the term vegetable market will be used for the study.

1.1 Rationale:
The traditional city of Kathmandu has provision of public market spaces at different pockets (open spaces, chowks, pati, sattal, bahals etc.) within walkable range, where farmers could sell their fresh produces. These spaces are vibrant and usually located at the nodes of major pathways, and they were sufficient to cater the needs of people previously. At that time, there was no need of any sort of written policies, bylaws, rules and regulations to operate the vegetable market; everything happened naturally and efficiently. Farmers would sell their vegetables without involvement of middlemen, they would manage their own vegetable wastes in form of fertilizers, they would sort out their transportation and storage issues at individual level; all these activities occurred naturally in a self-sustaining manner.

But the rapid urbanization of Kathmandu led to dramatic population growth and scarcity of agricultural lands (figure 1), decreasing agricultural production and increasing demands; making previous pockets of traditional vegetable market obsolete. According to 2011 census, population of Kathmandu city alone is 1,744,240; however, it is believed that the unofficial number might be very high compared to this census data. So, the demand for vegetables cannot be met locally, vegetables need to be imported from surrounding as well as farther areas.

Efficient transportation, handling, storage and marketing of these large amount of vegetable produces nationwide, is a tremendous challenge for vegetable markets. In order to carry out the function systematically and efficiently, plans and policies regarding vegetable market needs to be formulated, which should address various present day issues sufficiently.
Besides, public markets are important for providing income, employment, goods and services to poor people in Nepal. Further, vegetable markets are basically for the supply of fresh vegetables and fruits. Nowadays, due to busy life schedule usually people prefer processed food available within their vicinity, which led to increase in several nutrition related diseases. Thus planning of vegetable market is really necessary in the city. However, “it is found that the vegetable markets are not planned in reasonable walking distance in Kathmandu Metropolitan City” (source: RECPHEC, Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City). Furthermore, the existing vegetable markets are not functioning efficiently, the need of appropriate policies, bylaws, rules and regulations are felt due the degrading state (physically, environmentally, socially and managerially) of these marketing facilities.

Also urban areas in Nepal are mostly short of open spaces so socialization and availability of fresh air for healthy living is difficult. Further, the recent disaster, 25 April earthquake that caused huge loss of lives and property valued the need of open
spaces for evacuation and shelter. Thus the study for the better planning of vegetable markets is necessary to be accomplished.

1.2 Objectives:
The major objective of the study is to understand the policy environment and develop recommendation based on the study, which protects and promotes systematic development of vegetable markets. The specific objectives are:

- To study and understand the existing problems and issues of vegetable markets.
- To review the existing reports and policies related to vegetable markets.
- To recommend the policies for better planning and management of the vegetable markets in KMC.

1.3 Study Methodology:

1.3.1 Preliminary Data Collection:
The study includes review of existing reports, publications and national and international policy and planning documents for vegetable markets.

1.3.2 Reconnaissance Survey:
A reconnaissance survey was carried out on selective permanent and semi-permanent vegetable markets around Kathmandu municipality. Its major purpose is to get ground level view on current scenario and context of the vegetable markets in KMC, which has been helpful in understanding the issues and problems of the vegetable market. The survey basically involved observation of the vehicular traffic flow, pedestrian flow, activities of the vegetable market (buying, selling, loading, unloading, handling, packaging, processing, bargaining etc.). It also involved preliminary visual assessment of environmental aspects such as, waste generation, cleanliness, noise pollution, air pollution, and drainage.

1.3.3 Field Investigation and Visual Survey:
The field investigation and visual survey has been carried out on the selected vegetable markets of KMC on different time periods of the day. This consisted of in-depth site observation and interviews with the concerned stakeholders. Formal
interview with the representative of Kalimati Fruits and Vegetable Market Development Board has been conducted, regarding the scenario vegetable market, its issues and achievements. Similarly, informal focus group discussion has also been carried out with the shop owners, users and local people of the vegetable market. This investigation is directed towards various aspects such as market management, market information, market infrastructures, and macro level planning.

1.3.4 Data Analysis:
All the primary and secondary data from field investigations, visual survey, interviews, and desktop research are studied and analyzed; based upon which the problems and issues related with vegetable market are identified. These identified issues are categorized into several groups for convenience of study, and these issues act as the base for making probable recommendations.

1.3.5 Conclusion and Recommendations:
Based upon the study, data collection, and analysis key recommendations for the systematic development and functioning of vegetable market is made.

1.4 Scope and Limitations of the Study:
The study has following scope and limitations:

- The study is focused on Kathmandu Metropolitan City.
- The study is carried out mainly for permanent vegetable markets, with brief study of semi-permanent vegetable markets.
- Due to time and resource constraints, the study is majorly based on insightful observations, interviews, formal and informal discussions; hence detailed physical/social/economical survey needs to be carried out further.
- The study is focused on market infrastructure rather than other vague policies such as farmer’s protection, liberalization etc.
2 Literature Review:

2.1 Policy:
In simplest terms a policy is a decision or action by someone in authority effecting the opportunities and responsibilities of others and applying to those in similar circumstances; for instance, the rules established to run a market and the action of the market manager are a form of internal policy applying to all vendors\(^1\). A policy may affect a market directly; for instance, health rule on what can food products can be sold; or the effect may be more indirect i.e. government discounts on certain seeds, fertilizers etc.

2.2 Policy Framework:
The vegetable market system needs a policy framework for systematic and efficient functioning and its development; typical marketing policies include (White, 1999):

- Liberalization of agricultural marketing and removal of price control to increase the variety and quantity of market intermediaries.
- Encouraging farmers’ groups and cooperatives in producing and marketing higher value crops;\(^{1}\)
- Upgrading rural markets to reduce post-harvest losses and to improve handling;\(^{1}\)
- Improving access to market facilities by:\(^{1}\)
  - increasing the density of rural markets so that the average distance of farmers to market facilities is reduced;
  - facilitating construction of a network of wholesale markets, possibly in collaboration with the private sector;
- Encouraging the export of vegetables and fruits;\(^{1}\)
- Establishing an effective market information service to promote trading;\(^{1}\)
- Improving urban nutritional standards by increasing the availability of fresh produce in urban areas;\(^{1}\)
- Enhancing the revenue-earning base of local government; and\(^{1}\)
- Enhancing the capacity of communities and small-scale entrepreneurs to operate and maintain infrastructure.\(^{1}\)

\(^1\)http://www.pps.org/pdf/FarmersMarketPolicyPaperFINAL.pdf
2.3 Organizations to be involved:
The policy making process is an intensive task, which needs involvements from various stakeholders and institutions/organizations. According to White (1999), major organizations that need to be involved with the marketing policy development are as follows:

- Ministry of Agriculture (including research & post-harvest bodies)
- Ministry of Trade and Supply and Customs Department *
- Standards Organization
- Environmental Protection and Public Health Bodies *
- Ministry of Urban Planning
- Main Municipalities and District/Provincial Authorities
- Export Councils and Trade Organizations
- Chambers of Commerce *
- Farmers’ associations
- Representatives of private-sector trading interests and consumer groups

(those with * are optional depending on circumstances)

The understanding of vegetable market system is vital for appropriate policy interventions. The vegetable market functions in a structure made up of various marketing channels performing in a hierarchical order. The wholesale (permanent) vegetable market is one of the marketing channels, so in order to understand its role in the market system, whole marketing channels need to be understood clearly.

2.4 Marketing Channels:
Agricultural produce such as vegetables and fruits are usually mobilized through various types of marketing channels. So it is very important to define the types of marketing channels, their linkages and functions, in order to make any effective interventions in a marketing system. The rural-urban linkage in market is generally facilitated by various networks of market intermediaries usually consisting of: farmers selling directly in market, petty traders and assemblers, wholesalers/semi-wholesalers, commission agents/auctioneers/brokers, transporters/transport agents,
and retailers. These market intermediaries get generally active through various types of marketing channels are discussed below:

2.4.1 Rural Primary Markets:

In this type of channel producers are involved by direct sales of small quantities of produce to village traders, which is further distributed to rural consumers through retailers. These markets form part of a trade network and are normally arranged on a periodic basis commonly organized at a central place in a village.

2.4.2 Assembly Markets:

These markets are larger in scale than rural markets where greater quantities of produce are traded by producers or traders. These assembly markets are usually located beside main highways or other transportation nodes. Usually the produce is bought by traders or collection agents on their own, or on behalf of urban wholesalers.

2.4.3 Wholesale Markets:

Terminal wholesale and semi-wholesale markets are located within or near major cities (normally with population exceeding 0.5 million). These markets are basically supplied by rural assembly centers or directly from farms, either by traders or by large farmers. Although traders predominantly handle the transactions, many wholesale markets incorporate “farmer’s market”, where farmers can sell directly to retailers.

2.4.4 Retail Markets:

These markets are intended to serve directly to the consumers, found in main urban areas, such as provincial, town and city centers. These retails markets may provide semi-wholesale functions too, creating provision for “farmer’s market”; which is very common in developing countries.

2.4.5 Other Marketing Channels:

Especially in horticultural produces channels other than markets often exist, which include on-farm sales, where collectors purchase the produce (generally under contracts between the producers and distributors) and arrange transport to wholesale outlets packing houses or supermarkets.
The study focuses upon the wholesale (permanent) vegetable market; hence the
details of market infrastructures regarding the wholesale vegetable market needs to be
understood. The study of wholesale market infrastructures involves various aspects,
which determines the market feasibility, planning and design.

2.5 Market infrastructures:

2.5.1 Site Location:
For urban wholesale market its location is the major factor for its success. The
location is strongly guided by the transportation system of the place, modes of
transportation and transit stops. The preferred location for markets is usually with
good access to major road system, along with compatible land uses (such as catering
and agri-business industries). Urban retail markets must be convenient for customers,
usually within waking distance of the neighborhood. However, these location
requirements needs to be checked against other factors such as suitability of site in
terms of its cost, present ownership, size, suitability for construction and availability
of services. The optimum site location is very crucial, as it will reduce financial costs
of transportation for both buyers and sellers, lowering costs of the produces. This
reduced cost will facilitate energy savings and reduce environmental pollution.

2.5.2 Internal Traffic Flows and Congestion:
Traffic congestion usually occurs when access to the market is limited to only one
operating entry and exit; which is usually favored by the market authority to control
entry for maximizing revenues, as entry gates are used as check points for revenue
generation. The congestion is further intensified if the lead-in length of the internal
access road is very short and vehicular activity (parking, loading and unloading
activities) within the site is not rigorously controlled. However, congestion can be
controlled if road patterns are regulated in one-way system and the market trading
hours are extended or changed. But, still it will depend upon the controlling of
internal vehicular activities, with effective traffic management.
2.5.3 Market Lay-out:
The efficiency and the success of any market is greatly influenced by its physical lay-out. The market lay-out needs to achieve:

- an unobstructed traffic circulation pattern and effective parking control with adequate parking facilities being provided;
- maximum possibility for interaction between the market users leading to the possibility of optimum price formation;
- provision and full utilization of support facilities;
- adequate arrangements for display and sale of produce to maintain produce quality; and
- efficient produce handling (such as by pallets and forklifts).

2.5.4 Space Utilization in Markets:
Lay-out of market should be such that optimum space utilization can be achieved, which is one of the keys to success. The major decision is to determine the “core” space of the market; i.e. space where sales occur. This space includes both the area occupied by the traders and local circulation area needed for convenient flow. The area can be totally indoors or combination of covered space (stalls) facilitated by external gangways or access platforms. General space requirements for a market can be obtained as follows:

- 2 to 4 square meters per trader in small retail markets and, a space around 100 square meters per trader for wholesale market can be taken.
- Administrative office space shall be 10 to 15 square meters per office worker.
- Tentative space for cleaner’s store and guardhouse can be around 10 square meters for small market and 20 to 30 square meters for a larger market.
- Private toilet space of 2 square meters per 25 market employees (separating male and female) may be provided.
- Public toilet space of 2 square meters per 1,000 peak period market users (separating male and female) may be provided.
- Space for specialized uses should also be considered including auction slab, fruits ripening rooms and public cold stores.
- Requirements of ancillary space should also be considered (i.e. banks, catering facilities, sales outlet for packaging materials etc.)
Total of these figures is termed as *net usable space*, however further allowance of 10 percent should be added for general pedestrian circulation, such as main walkways; and the obtained area is *total usable space*. Normally, 5 percent further allowance should be made to *total usable space*, considering the area that building structure and infill wall occupies; depending upon the irregularity of site up to 10 percent shall be added. The final total area obtained is termed as the *gross market area*, usually this space is considered as covered space.

### 2.5.5 Estimating overall supply, demand and consumption.

It is important to estimate the total supply, demand and consumption of any agricultural produce, in order to review the adequacy of existing facilities or projection of demand for new facilities. A typical method of estimation is explained in the box below (White, 1999):

<table>
<thead>
<tr>
<th>Estimating overall supply, demand and consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating the supply, demand and consumption of produce is the key step in reviewing the adequacy of the existing facilities and projecting the demand for new facilities. The following steps need to be followed:</td>
</tr>
<tr>
<td>1. Define the population served by the market system, including the immediate population (urban or rural) and that of adjacent areas forming part of the catchment zone of the market.</td>
</tr>
<tr>
<td>2. Define the annual average population growth of the catchment zone.</td>
</tr>
<tr>
<td>3. Estimate the overall supply of produce (usually defined in tons) using a “Food Balance” approach:</td>
</tr>
<tr>
<td>• Total annual production, obtained from agricultural statistics and crop cutting trials;</td>
</tr>
<tr>
<td>• Plus imports and existing stock/storage (where these are relevant, such as with a wholesale market);</td>
</tr>
<tr>
<td>• Less waste and use for other purposes (e.g. seed) and future stock;</td>
</tr>
<tr>
<td>• Less annual exports;</td>
</tr>
<tr>
<td>• Balance available for consumption and processing;</td>
</tr>
<tr>
<td>• Less processing;</td>
</tr>
<tr>
<td>• Balance available for consumption;</td>
</tr>
<tr>
<td>• Estimate for specified years the average per caput consumption of fresh fruit and vegetables (balance available for consumption divided by population - see 1 and 2 above); and</td>
</tr>
<tr>
<td>• Estimate variations in consumption levels in different towns and regions (there is usually variation between urban and rural areas).</td>
</tr>
</tbody>
</table>

Box 1-1 Estimating overall supply, demand and consumption

Based upon this estimation of overall supply, demand and consumption total sales area required is determined, considering the economic aspects.
2.5.6 Site size:
The total site area required to accommodate the given covered space area (including sales, utility, administration, and other amenities) should be in the ratio of between 1:4 and 1:3, but can be in the range of 1:5 to 1:2.5 depending upon the context. The overall site area required in square meters can thus be obtained by multiplication of the gross market area and factor of 2.5 to 5, allowing traffic circulation, parking and site landscaping.

2.6 Desirable Market Characteristics:
The main factors to be considered while designing a new market or improving an existing one are as follows:

- Provision of adequate space is essential, for sales areas, administration, storage, specialized facilities, circulation and parking.
- The provisioned space should allow for future expansion needs as well as flexibility according to changing social and economic circumstances of the market.
- This flexibility should be addressed by building design as well.
- The building design should avoid different levels with road as far as possible for use of simple handcarts and sophisticated handling facilities.
- In simple rural and urban retail markets, especially for peak periods, emphasis should be given to the use of low-cost covering of sales area, by using permanent light-weight shade structures or retractable blinds.
- For traffic control segregation of pedestrian and hand-cart movement from heavy delivery vehicles must be carried out.

2.7 Social and environmental impact of marketing projects:
A review of environmental and social impact needs to be carried out before planning any market projects, in feasibility study stage of the project. Common social and environmental impact issues of a marketing project are as follows:

- Land acquisition and resettlement impact.
- Air, groundwater, soil pollution, noise pollution and effluent disposal.
- Handling, storage and transport of hazardous materials.
- Potential asbestos, dust and fiber pollution issues.
• Solid-waste management.
• Occupational health and safety implications.
• Energy conservation.
• Natural environment, heritage and landscape impact implications.
• Emergency, security and safety plans.

2.8 Defects in the Market System:
Defects in the market system hinders its efficiency, which creates negative impacts upon the users of the market, be it buyers, sellers or management sector. The general defects of existing market may be categorized into following aspects (White, 1999):

2.8.1 Physical aspects:
• Poor site location and road access is often the main issue affecting the market system.
• Insufficient sales space, particularly of temporary spaces at peak periods and during peak seasons, leading to produce being sold in the open, with consequent spoilage.
• Similarly, poorly designed and constructed sheds, makes the marketing process inefficient and inhibits customer flow.
• A general lack of building and facilities maintenance.
• Insufficient circulation space and traffic management measures, leading to vehicular and pedestrian congestion.
• Lack of parking provision and areas for unloading.
• Poor condition of roads and paving.
• Inadequate drainage and severe flooding problems, leading to produce losses and potential health problems.
• Inadequate site security and overnight storage facilities.
• Inadequate hygienic provision for meat, poultry and fish handling, including a lack of refrigeration facilities.

2.8.2 Social and managerial aspects:
• Difficulties in enforcing market bye-laws and regulations.
• An inefficient or uncontrolled use of market sales space with low sales
volume per trader and, often, low rents or charges;

- A high, unmet, demand for places in the market, frequently combined with high-profit margins for traders; and

- Market management, which establishes no clear relationship between revenues and costs, leading to the market being under-funded, especially for repairs and maintenance.

2.9 Market Information System:

Vegetable marketing information system (VMIS) can be defined as the method of generating information on time to assist farmers to take appropriate decisions for selling their produces at the appropriate time (Awasthi, 2007). Based upon these information farmers, traders, government officials, consumers and concerned stakeholders can perform their activities effectively and efficiently, boosting competitive vegetable market.

One of the most useful tasks of market information service is forecasting of future demand to guide farmers in their production planning. The national market information system disseminates the price information through mass media (newspaper, radio, television, internet etc.); but it is not clear how these information are useful to farmers. As farmers are interested mainly in prices of local markets where they sell their produces; hence market information system needs to be decentralized especially in remote areas where wide regional price differences occur.

Most Asian countries operate a market information service focused on promoting efficient marketing and raising farm incomes, however the form it takes varies according to the level of economic development, and state of agriculture in the range of subsistence to commercial farming. In countries like Indonesia, Japan, Korea, Thailand, agricultural market information is a national government service receiving regular government funding.

2.9.1 Market Information System in context of Nepal:

In 1960, development of marketing information system was initiated by the Department of Agriculture in a limited scale. After establishment of Department of Food and Agricultural Marketing Services, the collection and compilation of market
prices expanded in terms of the geographic coverage, type of prices, and commodity coverage. In recent times, the dissemination of the market information has greatly improved from the earlier times.

At present, various agencies are working for the collection, analysis and dissemination of agricultural marketing information services according to their requirements. Agriculture Business promotion and Marketing development Directorate (ABMDD) of Department of Agriculture is the main agency. Other agencies like Agro Enterprise Centre (AEC), Kalimati Fruit and Vegetable Market Development Board (KFVMDB), Trade Promotion Centre (TPC), National Planning Commission (NPC), Nepal Rastra Bank (NRB), District Agricultural Development Office (DADO) are also engaged in this activity (FAO, 1999 cited in Awasthi, 2007).

2.10 Vegetable and Fruit Wastes:
Waste management, especially at wholesale markets is one of major issues, waste reduction should be adopted as a precautionary step, which will reduce load on waste management. Considerable amount of fruit and vegetable wastes are produced on daily basis due to lack of proper post-harvest facilities at the fruit and vegetable wholesale markets. Based upon a survey of three major market centers at Narayangadh, Pokhara and Kalimati fruit and vegetable wholesale market, major causes of losses of produces appeared to be – lack of cold storage facility (67% of respondent’s opinion), inappropriate packaging and poor handling (22%), and poor quality of produce (11%) (Devkota et al., 2014). While the types of losses occur during handling are loss due to rotting (51%), mechanical damage (22%), and physiological loss (27%). However the survey suggested that the improvement over the prevailing marketing functions can contribute in reducing post-harvest losses of the horticultural produces. As 32% of the respondents believed availability of cold storage at market centers can reduce the losses; good packaging system (30%), avoidance of oversupply of produces (14%), grading of commodity before delivery by the producers (14%), careful handling and transportation facility (10%). Majority of respondents in Narayangadh favoured cold storage facility, while in Kalimati good packaging and handling was considered most important aspect.
2.10.1 Waste Reuse and Recycle:

The waste generated at the wholesale horticulture market is usually organic in nature, hence easily degrading. If, properly managed there is a lot that can be generated from these organic waste, but in case of mismanagement it produces headache for the authority, as these degrading wastes creates nuisance (smell, dirt, spreading of disease etc.) which are very difficult to handle.

Based upon the survey carried out, all respondents believe that the wastes generated inside the market can be recovered though reuse/recycling (Devkota et al., 2014). Regarding the methods of recovering, 67% responded that composting could be the best idea, while 33% of them were in favour of reusing by stall-feeding to livestock. However, such organic waste can be utilized as the resources for composting and vermicomposting (Pant and Yami 2008, Yami and Shrestha 2005, Simko 2000, as quoted in Devkota et al. 2014), instead of dumping these organic wastes into landfill sites. Landfill sites may be an immediate solution but not a sustainable way of waste management, hence concept of reuse/recycle of organic waste is better alternative technology, regarding organic waste management.
2.11 Inference:
Policy for vegetable market needs a policy framework, which should address multifaceted issues and this involves collaboration with different stakeholders and organizations. The vegetable markets are perceived in different markets forms, as there are various marketing channels through which the vegetable produces move from producers to consumers, and all of these operate in a hierarchical structure; which is very necessary to understand the context of permanent and semi-permanent vegetable markets.

There are various factors to be considered while designing market infrastructures. Site location is one of the major factors determining success of the market. Similarly, internal traffic flows and congestion should be considered, along with loading unloading spaces. Market layout should be efficient and space utilization should be proportionate to different activities. Sales area could be determined by estimating overall supply, demand and consumption; and based upon the proportionate built up and open space area; site size can also be calculated.

Likewise, desirable market characteristics should be considered while planning and designing the vegetable market. Market system should be analyzed in terms of physical aspects, social and managerial aspects, and environmental aspects.

Different aspects of Market Information System should be explored, because of their importance in competitive and fair market. Major issues such as vegetable waste management should also be considered and planned in advanced.
3 Vegetable Market in Local Context:

3.1 Vegetable Sector in the Context of Nepal:
The vegetable sector in Nepal has grown rapidly, between 2000 and 2020, overall vegetable production has increased by an average of 6.9% per annum (45% overall), which is ahead of overall average population growth of 1.47% over the same time period. The area cultivated for vegetables has increased significantly (33.2% increase – 4.6% annually), but there is no increase in total arable land area over this time period, which indicates that vegetables are displacing crops. The average yield of vegetables has also increased by 2.2% on average annually (17.7% overall). It is also noted that Nepal’s per capita vegetable has increased from 49kg/person/year to 60 kg/person/year, but still below the human vegetable nutritional requirement of 104kg/person/year over the last two decades (Awasthi, 2007).

According to the 2009/10 Nepal Vegetable crops survey, vegetable farming is considered as a common and important source of subsistence for over 3.2 million families (69% of all households) in Nepal; 17% of which are female-headed. However the majority (90%) of producers have less than 0.5 hectare (ha) of land available to them and grow mainly for subsistence, with only 18% growing for the market and only 5% deriving their main income from vegetables (7% in the hills and 4.5% in the Terai). For 12% of growers, vegetable farming (income and consumption) sustains them all year round, with a further 37% being sustained for 4-6 months. Compared to staple crops, vegetables can be grown year-round, which provides an opportunity for extra income generation, but in-turn also intensifies cropping patterns over the year.

It is estimated that there are more than 247 cultivated vegetable crops, and more than 50 crops are common in Nepal. Due to the wide range of climatic conditions (ranging from alpine temperate to tropical), it is possible to grow almost all types of vegetables within the nation (Awasthi, 2007).

---

3
The most prevalent vegetable crops grown in Nepal include (in terms of total hectare of area): cauliflower (33,172 ha), tomato (19,724 ha), cabbage (14,306 ha), pumpkin (9,757 ha), cucumber (8,634 ha), eggplant (8,172 ha), okra (7,473 ha) hot pepper/chilly (7,007 ha) and bitter gourd (4,250 ha).5

In Nepal, there are 33 market centers for fruits and vegetables, 21 collection centres, 8 wholesale markets and 4 retail markets constructed in the initiation of government, while some are managed by the private sector (Awasthi, 2007).

3.2 Vegetable Market in the Context of Kathmandu:

The agricultural fertile land of Kathmandu are being encroached by built up spaces, catering increasing demand of shelter, hence Kathmandu is not sustainable in itself in terms of vegetable production. It is estimated that around 50 to 60% of total demand of vegetables in Kathmandu is fulfilled by vegetable production in hilly areas (Kavre, Dhading, Bhaktapur, Lalitpur, Makwanpur, Kathmandu, Nuwakot, Sindhupalchok, Gorkha, Dolakha, Rasuwa etc.), while remaining demands are sourced from Terai region, India and China.

These large imports of vegetable produces and demands led to establishment vegetable markets, including wholesale and retail markets, semi-permanent markets like haat-bazars, roadside vendors and mobile vendors. The vegetables are also being sold on local retail shops (kiranapasal), people without easy access to vegetable markets usually purchase from these shops; however vegetables are being sold at few big departmental stores, which are mostly used by upper middleclass people. The tendency of the majority of people is to find the best market price for the vegetables, for which they are drawn to places where there are more than one vendor available, so they can compare for lowest price and quality also. People needing low quantity of vegetables usually go to semi-permanent vegetable markets, and who needs in large produce usually go for wholesale markets. The mechanism of vegetable supply in Kathmandu, and different aspects involved, from vegetable production to consumption can be understood from the given flow diagram (fig. 1).

There are numerous vegetable markets within Kathmandu Valley, among them Kalimati Vegetable Wholesale Market, under government undertaking, is the largest market of Nepal. Other wholesale markets (primary and secondary) in Kathmandu city can be located in the respective areas - Tukucha, Balkhu, Kalanki, Baneshwor, Koteshwor, Balaju, Chakrapath, Khusibu, Boudha, Minbhawan -2nos., BijuliBajar, Naksal, Chabahel, Jorpati, Samakhusi, NakhuDobato, Sano Bharyang.

Figure 3 Typical flowchart of vegetable produces from production to consumption, along with various stakeholders involved. 
3.3 Semi-permanent Vegetable Market:
Semi-permanent markets usually have to clear demarcation of space or any permanent structure, and timing of market is usually morning and evening only. Most of these vendors are not required to pay rent, as they typically parts of rights-of-way or spaces adjacent to temples (source: RECPHEC, Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City). These markets are usually located within the walking distance from the residential areas, near the transit nodes or social spaces.

3.3.1 Linkages with permanent vegetable market:
Sources of vegetable produces for semi-permanent vegetable markets are permanent (wholesale) vegetable markets, local farmer’s market and nearby agriculture farms. Although the traders of semi-permanent brand their vegetable produces as local products, it is believed that most of these produces are from the wholesale markets. As most of these vendors are seen everyday with similar vegetable produces in large
quantity, but due to scarcity of agricultural land in Kathmandu it is difficult to cater the demands on daily basis in such a large quantity. Furthermore, it can also be noticed that there are similarities in the quality of the vegetable in wholesale and semi-permanent market, and prices relative to wholesale market rates. However there are occasional and original local farmers in semi-permanent market areas, who sell their fresh vegetable produces in small scale, with difference in quality of the produces from the wholesale market; and their prices are non relative to the wholesale market rates.

3.3.2 Linkages with social and cultural aspects of the people:
These semi-permanent markets are vibrant areas, as variety of social activities occur in these areas. During traditional times, these market areas used to be a social space, where people interacted, socialized and traded the produces. These market places were located at the transit nodes, temple areas and other open spaces; so these spaces became part of the daily life of the people. But in recent times, these spaces are overloaded with trading activities, which is result of demand of the rapidly increasing population. So most of these semi-permanent markets today, purely have been used as trading space; rather than a mixture of socializing space like in traditional times. Social life of people began to occur more and more indoor environment of their homes and workplaces, due to change in cultural and technological lifestyle of people.

3.3.3 Importance in urban planning aspects
These semi-permanent vegetable markets should serve as a breathing space for the urban people, amidst the traffic congestion and scarcity of the open space in urban areas. In traditional times these spaces were sufficient to cater the social, cultural and economical needs of the people, but in modern times with increase in population, change in lifestyle led by technological advancements, these spaces are hardly sufficient. These spaces merely act as the congested trading spaces, often hampering the nearby traffic flow. However in traditional urban core, these spaces are within walkable distance from residential areas, but in comparatively newly formed settlements, these types of spaces are not provisioned efficiently in planning level. It should be noted that efficient planning and allocation of these markets are essential for wellbeing and efficiency of a community.
3.3.4 Case Study of Asan as a semi-permanent vegetable market:

Asan is at prime location of the traditional town, as six routes converge at that point, and one of them being the major traditional trade route of Kathmandu. As many semi-permanent market places of the traditional town, Asan also possess its social, cultural and religious importance. There are many temples scattered in the Asan square, major one being the temple of the Goddess Annapurna (symbolized as the goddess of paddy).

The Asan area is usually vibrant and often congested due to the market activities and traffic flow in the area, as the site is one of the major junctions of the traditional urban core.

Aerial view of market activities and traffic flow in Asan.

Key Issues:
Following are the key issues observed during the site study:

Traffic Congestion:
Major problem of semi-permanent market of Asan is its traffic congestion. The entry of vehicles to the area during peak hours ‘morning and evening’ exacerbates the congestion.

Territoriality:
As there is no proper demarcation of the areas for trading purpose often the vendor sizes expands and contracts according to the quantity and nature of their agricultural produces. So traffic congestion is dependent on size of these vendors.

Waste Generation:
Often the waste generated are not properly managed by the vendors and the buyers, most of them throwing unnecessary portions haphazardly, causing difficulty for the cleaners of the area.
3.4 Permanent Vegetable Market:
Permanent vegetable markets or often known as wholesale markets, have fixed locations and area, including many vendors under the same place (source: RECPHEC, *Mapping Vegetable Markets and Vendors in Kathmandu Metropolitan City*). These markets are permanent and have large areas compared to semi-permanent markets.

3.4.1 Case Study of Kalimati Fruits and Vegetable Market as a Permanent Vegetable Market:
Kalimati market has been functioning as a major fruits and vegetable market over 30 years. From 2043 B.S., Kalimati market started to function with small-scale infrastructures, however most of the current market infrastructures are a result of aid from UNCDF in 1990. For efficient management of the market, “Kalimati fruits and vegetable wholesale market development board” was formed, under Development Board Act-2013, in 2051 B.S. However, the board was again re-established as “Kalimati fruits and vegetable market development board” under Development Board Act-2013 in 2058 B.S.; to broaden the responsibility of the committee.

3.4.1.1 Objectives of the Board:
- To develop market for increasing production of fruits and vegetables within the country.
- To ensure competitive flow of fruits and vegetables from production areas to urban consumption areas, encouraging strong and complete market, through proper utilization of the resources.
- To increase production and productivity of fruits and vegetables by creating
market facilities and opportunities.

- To strengthen economic aspect of Kalimati market management, and function with service oriented and commercial ethics.
- To contribute the economic sector through increased productivity and ……, based upon geographical attributes.

3.4.1.2 Policy of the Development Board:

- Market service, facilities and infrastructures are to be provided only to Nepalese citizens.
- To strengthen and develop the relationship between the market and production center.
- To ensure proper commercial use of the committee’s services, facilities and infrastructures.
- To play important role in agro-market sector through co-operation with government and other institutions.
- To strengthen implementation aspects through timely adjustments in plans and policies.

3.4.1.3 Works to be carried out by the Development Board:

- To make policy regarding market management and its implementation.
- To determine minimum standards for quality and quantity of produces being sold at the market.
- To manage staffs required for market management, along with providing incentives and services for the staffs.
- To increase it’s working area, in order to direct markets established through Nepal government or other sectors.
- To carryout works regarding packaging, grading and quality determination of agricultural produces.
- To give market facilities to the wholesale and retail traders, along with fruits and vegetable producers.
- To determine rates for providing market services and facilities.
- To solve the issues regarding market functioning.
- To maintain healthy environment of the market area by proper cleaning.
To carry out works for development for manpower of the board.

To carry our other important miscellaneous works for market management.

To carry out other important miscellaneous works regarding sales and purchase of agricultural produces.

3.4.1.4 Market Facilities of Kalimati Fruits and Vegetables Market:

Wholesale Market:
Kalimati fruits and vegetables market is majorly a wholesale market, which is being functioning in the building and sheds. 322 stalls are being allocated for wholesale marketing, among which 26 stalls are allocated for farmer groups/ co-operatives. The space of wholesale market is zoned in different sections – potato section, onion section and fresh vegetables; zoning is also carried out according to different co-operative groups and institutions. Minimum amount to be traded in wholesale market is 5 kilograms, below which trading is not allowed. In order to trade in the wholesale market one has to take permit from the committee, and the rent has to be paid for the allocated space and other facilities. Main customers of the wholesale markets are wholesale and retail traders of other markets, including cycle traders, cart traders, hotel, hostel, restaurant, and schools; while regular people are also being catered.
**Retail Market:**
There is provision of retail market, in order to cater the people trading small quantity of produces. Total of 81 stalls are being allocated for this purpose. Traders have to take permit from the board in order to trade in this space, monthly rent are fixed according to the space occupied by the traders.

![View of retail market section of the vegetable market.](image1)

**Farmers’ Market:**
There is provision for farmers to sell their fresh vegetable produces on daily basis in the Kalimati market area. Two sheds ahead of entry gate, and hard paved open space in front of it are provided for this purpose. The market is allowed to open for two times a day, from early morning to 9 a.m. and from 4 p.m to late evening. In order sell their produces farmers have to pay minimal amount of NRs 10 each time they use the space to sell. It is estimated that 75 to 150 farmers arrive on daily basis to the Kalimati market to sell their vegetable produces, and majority of farmers are believed to be of Kathmandu.

![View of Farmer's Market area, including open space and sheds.](image2)
Fish Market:
Although this is a fruits and vegetable market, strangely there is provision for fish market too. Twelve cages near the ice plant are allocated for the fish market. Initially the market was at Khichapokhari, which is being re-established in this market. Around 10 metric ton of fish are imported on daily basis to the Kalimati market.

Other Market Facilities:
There is provision for storing seasonal fruits like orange, papaya and others with the market, in vacant spaces, sheds and other alternative spaces. Some spaces are also provided for fruits, seeds, fertilizers, dairy products and agro products, along with necessary materials.

3.4.1.5 Physical infrastructures of the market:
The total site area of the market is 45 ropanis (22,893 sq.m.). There are various services and facilities provided by the Kalimati market:

- Multipurpose building - 4903 sq.m.
- Wholesale market building (old fish shed) – 508 sq.m.
- Wholesale market sheds – 48 stalls
- Retail market sheds -2 nos.
- Farmers’ market – 2 sheds and hard paved open space infront
- Farmers’ market shutters – 6 nos.
- Fish market – 12 cages
- Ice-plant 220 sq.m., 15 metric ton daily production
- Cold room 4.5 metric ton storage capacity, Freezer room 9 metric ton storage capacity
- Administration building – 792 sq.m.
- Storing cages – 24 nos.
- Building with 12 shutter shops (near administrative building and farmers’ market)
- 53 rooms above Multipurpose building and fish market
- Bank area (currently used as garlic and ginger trading space)
- Restaurant – 1 nos.
- Mesh/ Canteen – 4 nos.
• Electricity station
• Generator – 250 KVA capacity
• Water tank – 160,000 litres capacity; with deep tubewell
• Water purification plant
• Toilets
• Black topped road
• Parking area
• Loading/ Un-loading area, etc.

3.4.1.6 Market security service:
There is provision of 24 hours security for the committee and market users. Total of 30 staffs are related to security services among total of 79 staffs of the market.

3.4.1.7 Waste collection and management:
Huge amount of waste is generated in the market on daily basis due to the nature of vegetable produces. Waste collection and management is being carried out with involvement from private sectors.

3.4.1.8 Market information service:
The board has managed to collect current rates of produces from the market during morning and daytime; in order to inform farmers, traders and concerned stakeholders about the current trading rates of the produces. The information is conveyed through various means – digital scrolling board in the market, daily bulletins, news channels, emails, websites etc.

3.4.1.9 Quantity and Quality Controlling:
In order to strive the market towards healthy, competitive and qualitative market, the committee has been carrying out quantity and quality controlling of the produces being traded in periodic basis; in co-ordination with Nepal Standards Department (GunastarthaNaaptaulBibhag).

3.4.1.10 Market transaction nature:
In 2070, total market import was 220600.268 metric ton, including 80.46% vegetable produces, 12.76% fruit produces, 4.63% masala produces, 1.85% fruit produces and .29% other agro produces. Although the market is opened 24 hours for importing
produces, imports are usually brought during nighttime. Whereas major market trading period is considered to be from 3 or 4 am early morning to 10 to 11am. Wholesale trade is the major activity in the market compared to other forms of trade. Market usually contains both seasonal and unseasonal agro produces. The market imports are usually made through farmer himself, middlemen, traders and their representatives.

The price fixing of produces is usually carried out by bargaining among farmers /suppliers, and traders; the committee is not involved in determining price of produces. The price of vegetables if greatly influenced by its market demand and supply, quality, source of supply, consumer’s desire, context and time factor.

3.4.1.11 Major supply sectors for the market:
Most of the produces are supplied nationally; while 24.37% are imported form India, and 1.67% from China.

3.4.1.12 Issues related with the Development Board:
Major issues related with the Development Board (based upon annual publication book 2070/71) are mentioned below:

- Uncontrolled entry/exit of agro produces transport vehicles in the market.
- Problem in additional market extension within the site area.
- Problem in waste management and scarcity of dumping sites.
- Difficulty in enhancing and strengthening the skills of manpower involved in the market, both traders and staffs.
- Minimal use of technology and machineries for handling, packaging and grading of produces.
- Problem in internal import and transportation of agro produces.
- Lack of co-operation with other agro markets, including government and non-government sectors.
4 Observations and Analysis:

Based upon the literature review, site study, interviews and observations following analysis are carried out regarding vegetable markets in KMC.

4.1 Issues related with vegetable market:

4.1.1 Solid Waste Management:

Solid waste management seems to be one of the major issues of the permanent vegetable market following are its major issues and problems:

- Solid wastes are not properly cleaned from the market stalls, access paths, roads, and storage and collection points. This is due to various reasons:
  - Lack of awareness among farmers, sellers and buyers regarding management of vegetable waste.
  - Difficulty in cleaning due to nature of waste and habit of waste disposal from both sellers and buyers, and the waste starts decaying at those places.
  - Difficulties in monitoring of waste management, as number of users are very high especially during peak hours; but it is also a result of inefficient management.

- Due to improper solid waste management, the hygienic aspects of the market were very much compromised, dirt and smell all over the area.

- Waste management has been carried out on contract basis, individual stalls pay cleaners to clean and carry their vegetable related waste from stalls to common disposal area within the market area; other set of individuals are responsible for collecting waste from common areas to disposal vehicles; and then the solid waste are disposed to dumping site or composting sites. Although the system sounds efficient, it is very inefficient based upon the site observations and interviews.

- Composting of the solid waste from the market has not been successful; one of the reasons is all kind of waste being dumped to same place, segregation being major issue for the waste handlers.
Sweepers cleaning the cleaning the wastes during noon, as morning time is the peak hour for transaction.

Vegetable waste dumped beside the entry ramp of the wholesale market.

Vegetable waste dumped haphazardly beside entry steps of the wholesale market.

Vegetable and other wastes scattered beside footpath and internal road.

Haphazardly scattered vegetable waste within the wholesale market.

Vegetable and other unscreened waste dumped haphazardly over the collection point of the Kalimati vegetable market.
4.1.2 Environmental Pollution:
- The noise pollution caused by marketing activities and from moving vehicles cause constant strain to the ears of the users and nearby residences.
- Considerable air pollution is noticed during peak hours of vehicular entry and exit periods, further aggravated by traffic congestion.
- Often there are complaints from the surrounding environment regarding smell, noise pollution, and sewage of market being infiltrating into the near by wells of neighborhoods.

4.1.3 Physical Aspects:
- The location of vegetable market in residential cum commercial area is causing nuisance to the neighborhood and traffic congestion in the area.
- The physical infrastructures regarding road, pavement, water supply system and drainage are in dire state, due to lack of proper maintenance.
- Sales spaces are insufficient during peak hours of trading.
- Drainage problem is prominent mostly due to clogging of the solid waste in the drainage.
Motorcycle parking allowed outside the secondary gate of market; but due to lack in monitoring motorcycle passes into the prohibited zone (Kalimati Vegetable Market).

Vehicle unloading/loading, parking, circulation all activities are carried on same space causing overall congestion in already small space (Kalimati Vegetable Market).

Haphazard vehicle unloading, difficulty in transporting produces from vehicle to the market due to level difference. (Kalimati)

Vehicles lining to exit after loading the vegetables from the Kalimati vegetable market, due to traffic congestion in the main road

Due to increased ceiling height, the space is more spacious in Bhalkhu Vegetable market compared to Kalimati Vegetable Market, however problem of waste disposal is similar.

Unmanaged Parking, and loading/unloading area of the market beside river bank (Balkhu Vegetable Market).
4.1.4 **Traffic Congestion:**
- Vehicle parking areas are poorly managed and insufficient giving rise to traffic congestion.
- The traffic congestion appeared not only inside but outside of the market too, as the market gate opens in the busy main road (which is also a highway and inner-city road). So during entry and exit of vehicles from the gate there is always vehicular traffic disturbance in the major road causing lengthier traffic jams.
- Haphazard loading and unloading spaces within the market premises aggravates traffic congestion and confusion among the visitors of the market, as it affects pedestrian circulation within the market.

4.1.5 **Management Issues:**
- There are no rules and regulations/ laws regarding functioning of the vegetable market, which needs to be addressed timely for efficient market system.
- Although space for farmers market is provided, people are using footpath for trading, causing congestion in the market. There are also cases of non-farmers occupying the space whole day, exceeding trading hours of the farmers market.
- Secondary renting provision seems to be working in the market, although it is not clearly visible. It is also difficult for the market committee to monitor such things because of socio cultural aspects of our society; for instance a trader may bring new person and say he is the family member or friend who is to help him.
- Priority given to the old traders of the wholesale market may be demotivating factor for the new traders and hinder the essence of the competitive market.
- Although cold storage is desirable facility for a wholesale vegetable market, based upon market activities it is observed that most of the fresh vegetables are sold within a day, and for next day people prefer another lot of fresh vegetables compared to one stored in the cold storage; also traders wouldn’t like to pay extra for cold storage facilities. There is total of 13.5 metric ton cold and freezer room in fish market, which is hardly used by the fish traders.
• The development board (management) has no role in fixing price of vegetable produces, the management leaves it to the free market principle. But there are complains that the price of the vegetables are fixed by single authority in Kalimati market (small group of people/ brokers), based upon which price at other markets are fixed.

• There is no provision of limiting the maximum number of traders in the wholesale market, leading to inefficient and chaotic market environment.

• The informal interviews suggested that the rent is taken even from illegal stalls at footpath area inside the market, thus one paying higher rent in permanent stalls and selling same produces suffer.

• Manpower per stall – Retail – owner and helper , Wholesale- owner, helper and staff.; and these names aren’t mentioned in identity card of the owner; making it difficult to monitor if the sellers of the stalls are the original owners of the stalls.

• It was suggested that Middleman sells vegetable at expensive rates before farmer’s arrival or in absence of farmer and in low rate in front of farmer, taking extra amount to the pocket of middleman, causing farmers and consumers to suffer; which indicates towards major involvement of middlemen and lack of monitoring mechanisms from the management.
The tendency of disposing vegetables instead of selling it at cheaper rates was also known through informal interviews, this activity harms both producer and consumers.

Fish market in vegetable market creates more unhygienic condition, smelly areas for people buying vegetables, which questions the suitability of placing unmanaged fish market near vegetable produces.

There is no provision of grading or packaging in the major wholesale market.

There is no emergency or safety plans during the scenario of disasters like earthquake or fire hazards.

4.1.6 Macro level Planning:

- There is no planning approach, where importance and accessibility of vegetable markets are considered, in terms of location and scale of the market.
- There is no motivation for fresh vegetable consumption from the government, regarding the market facilities, infrastructures, planning and policies.
- Involvement of middlemen increases when farmers couldn’t reach to wholesale markets on their own, poor infrastructural facilities are often the causes of this phenomenon.
- The current Market Information System lags the need of current market, as farmers haven’t been able to benefit from the Market Information System as it only gives rates of the wholesale market, as farmers needs rates of local market where they can sell their produces.
- No provision of cold storage facilities near production areas, which results in tremendous amount of post-harvest wastage of vegetable produces.
- Chemical testing facility only in wholesale market causes wastage of produces, time and energy, incase vegetables are found chemically unacceptable.
- There are no collection centers near the production area, as a result seasonal surplus produces are often wasted, which could have been stored at sold later, resulting in mutual benefits for both producers and consumers.
- There is no proper plans and policy for treatment of solid waste generated from the vegetable markets, these wastes could have been reused and recycled for economic benefits.
Co-operatives functioning in the market are mostly concerned with monetary transactions, not involved in vegetable market development aspects.

4.2 Key Stakeholders:
The following key stakeholders and institutions are identified in planning and management of vegetable markets in KMC:

Ministry of Agricultural Development (MoAD):
The Ministry of Agricultural Development is the central apex body of Government of Nepal, responsible for agriculture and allied fields. The vision of the ministry is to improve “To improve the standard of living of the people through sustainable agricultural growth by transforming the subsistence farming system to a competitive and commercialized one.” The ministry is responsible for formulation of plans and policies related to agricultural activities, promotion of agri-business, evaluation and monitoring of related activities, maintaining statistical records, ensuring food security and others.

Ministry of Urban Development (MoUD):
MoUD is responsible for overall planning, development and management of urban areas with a vision to make urban areas and settlements managed, clean, beautiful and inclusive of proper infrastructures and services. It closely works with municipalities. Department of Urban Development and Building Construction (DUDBC) is a department functioning under Ministry of Urban Development, which is actively working in the urban development, building and environment sector. It is responsible for formulating different policies, guidelines and byelaws. Given, the importance of different forms of vegetable markets in urban scale, MoUD could include the aspects of vegetable markets along with open spaces in future plans, policies, guidelines and byelaws.

Ministry of Land Reform and Management:
The ministry has formulated Land Use Policy 2069 B.S., and after the mega earthquake of 2072 B.S., the ministry has re-formulated the policy as the Land Use Policy 2072 B.S., considering the impacts of natural hazards like earthquake and other calamities. The ministry has zoned the land use into various sectors like agricultural,
residential, commercial, cultural and archaeological, industrial etc. The agricultural land use zone could be planned following the principle of sustainability, and land use plan should be implemented strictly. Similarly, large-scale wholesale vegetable markets needs to be zoned considering its surrounding activities.

**Ministry of Federal Affairs and Local Development (MoFALD):**
The Ministry is responsible for coordinating, supporting, facilitating, monitoring and evaluation of decentralized local development programs and activities conducted by local governing bodies- District Development Committee, Municipality and Village Development Committee, in accordance to Local Self-Governance Act (1999). The Ministry has formulated and implemented Environment Friendly Local Governance Framework (EFLGF), which is now being implemented at District, Municipal and VDC level. The ministry is responsible for coordinating with the local level governance like VDCs and Municipalities.

**Kathmandu Valley Development Authority (KVDA):**
KVDA was established in 2012 and the Authority has with primary mandate to prepare and implement an integrated physical development plan for Kathmandu Valley, and the apex governing body chaired by the Minister of Urban Development. It has authority to prepare related by-laws, regulating mechanisms, guidelines, standards and tools. It has published ”Atlas of Open Spaces” in 2015 which has listed all the probable open spaces in Kathmandu Valley which can be utilized during disasters. It can co-ordinate with other stakeholders to provision semi-permanent vegetable markets in these open spaces, as new open spaces needs activities to sustain.

**Kathmandu Metropolitan City (KMC):**
KMC is a local body working in accordance to Local Self-Governance Act (1999). KMC is responsible for management of the semi-permanent vegetable market areas, including area designation, its maintenance, waste collection and disposal. KMC is also responsible for regulating and managing the dumpsites for the wastes collected from the vegetable markets. KMC is also responsible for regulating vehicular traffic flow in semi-open vegetable market areas, as these areas are often congested, KMC can ban or time vehicular flow in these semi-permanent vegetable markets, mostly in traditional urban core.
Department of Archeology (DOA):
Department of Archeology established in 1953 A.D. under the Government of Nepal, is primer organization for the archaeological research and protection of the cultural heritage of the nation. Most of the semi-permanent vegetable markets in urban core are scattered around the monuments with archaeological importance. And these market areas are often crowded and congested by pedestrian and vehicular traffic flow. DOA needs to monitor, maintain and preserve the cultural heritage under their jurisdiction by formulation of appropriate plans and policies to sustain and preserve these cultural heritages. This will preserve the local character of the semi-permanent vegetable markets inside the traditional urban areas.

Kalimati Fruits and Vegetable Market Development Board:
“Kalimati fruits and vegetable wholesale market development board” was formed, under Development Board Act-2013, in 2051 B.S. However, the board was again re-established as “Kalimati fruits and vegetable market development board” under Development Board Act-2013 in 2058 B.S.; to broaden the responsibility of the committee. It is the major stakeholder for vegetable market in KMC; as its major objectives are - to develop market for increasing production of fruits and vegetables, to ensure competitive flow of vegetables, to contribute economic sector through increased productivity. However the market is responsible for efficient distribution of vegetable produces from production centers to retail and consumer sectors, price fixation of vegetable produces, and market information.

Various other stakeholders:
Various other stakeholders like wards, TLOs, user committee are responsible for managing and regulating vegetable markets. In many places vegetable markets are established through private initiation. All the wholesalers, retailers, traders, and middlemen could be taken as stakeholders for vegetable market development.
5 Conclusion and Recommendations:

5.1 Conclusion:
The vegetable sector market in context of Nepal is expanding, and Nepal is already sustaining itself in terms of fresh vegetable produce. In order to properly manage, control and develop the vegetable market, comprehensive vegetable market policy is required. From this study, the major aspects to be addressed by the policy are considered as improvement of Market Information System, Market Infrastructures, and Waste management system. It should also give emphasis to inclusion and placement of markets in city planning and design along with systematic management of existing markets in the city. This will act as guidance for opening new markets, and for the systematic development of existing markets. Various environmental aspects should also be considered while planning and designing for (wholesale) vegetable markets, EIA should be carried out for before commencing any type of vegetable market projects.

5.2 Recommendations and Policies:
The policy needs to be addressed at various levels, and include all the important aspects of the vegetable market. From the review it is found that there are no specific guidelines or policies that directly address vegetable markets as part of city development. Based upon the literature review and study of vegetable market in local context following policy recommendations are made for vegetable market of Kathmandu, under different aspects.

5.2.1 Macro Level Planning:
- To increase vegetable consumption, it is necessary to develop marketing channels in coordination with vegetable production; as after production marketing is most important function consisting of assembling, processing and distribution of vegetable produces (Awasthi, 2007).
- Some financial arrangements must be made for farmers when his produces leaves his possession, as it takes time (cleaning, grading, processing, packaging) before it reaches in the acceptable state for the consumer; and this should be provisioned by the marketing itself (Awasthi, 2007).
• Availability of fresh produces in urban areas should be increased in order to improve urban nutritional standards.

• Policies related to vegetable market should be incorporated in Land use planning, building byelaws, environmental acts/policies, and urban policy as well.

• Access to the major market (wholesale market) from production areas should be improved.

• Development of market infrastructures needs to be carried out to improve market competitiveness and reduce the number of middlemen or their profit margins (Ranathilaka, 2014)

• Effective Market Information System should be provided to promote trading which benefits the producers first.

• Collection centers near production area should be provided, with proper facilities like cold storage, while the entry points of vegetable containers could be equipped with chemical testing lab to discourage use of harmful chemical in the vegetables.

• Private and Sahakari (Co-operatives) involvement in market development should be initiated (Agri-Business Policy, 2063).

• The organic waste generated from the vegetable market should be reused and recycled, i.e. reusing by stall-feeding to live stock, and recycling into valuable organic fertilizer by composting and vermin composting (Devkota, 2014).

• Scale and location of vegetable market needs to be planned according to the population density, demand, supply and consumption pattern of the targeted areas.

5.2.2 Physical Aspects:

• Location of the site of wholesale vegetable market should be near agri-business industries and catering services; and the site should be connected with the major road system.

• Location of small vegetable markets should be included in any new town planning and design.

• Conditions of roads and paving should be improved.
• Sufficient drainage system should be provided and timely monitoring and maintenance should be carried out.
• Space for parking should be sufficient and planned efficiently.
• Space for loading and unloading should be planned systematically, with sufficient space.
• Storage facilities should be sufficient and fulfill requirements of a proper store.
• Sales space should be sufficient, considering the peak period activities.
• The ratio of built-up space to open space should range between 1:2.5 to 1:5, depending upon the context.
• Concept of multistory vegetable market can also be explored to optimize the scarce land with better management and increasing the serving capacity for growing demands.

5.2.3 Social Aspects and Managerial Aspects:
• Enforcement of bye-laws and regulations should be carried out through proper monitoring mechanism.
• Awareness among the various stakeholders of the market should be created regarding waste management habits, i.e. farmers should screen useless produces in their fields, traders should also screen undesirable produces in the collection center, and the sellers and buyers in the market should manage the vegetable waste in desired location only.
• The revenues generated from the market should also be allocated for maintenance of market infrastructures (road, water supply, waste management etc.)
• The price fixing mechanism of the produces should be monitored and analyzed by the concerned authority (Kalimati Fruit ad Vegetable Market Development Board).
• Market Information System (MIS) should not only include, price, volume, sources of arrival of vegetables and fruits like Kalimati Fruits and Vegetable Market Development Board, but the MIS should also be developed to educate the farmers to clean and screen the unnecessary residues of their vegetables at
source, which can be utilized as compost (Awasthi, 2007).

- Uniform national grading system should be introduced, which contributes in determining the price of similar products.
- Gap between farm gate price and price paid in wholesale markets by the consumers should be narrowed, with strong monitoring of middlemen involvement.
- Facility of the e-commerce should be explored for commercial agricultural markets (The Agri-Business Promotion Policy, 2063).
- Effective facility and monitoring system should be incorporated regarding the cold storage facility, packaging, handling and transportation, grading of the vegetable produces; as these factors will significantly reduce post-harvest wastage of vegetable produces.
- Efficient waste collection system should be provided in the site, including screening of wastes according to their nature (organic and inorganic); and provision of regular transportation the collected waste to dumping site or composting site should be managed.
- Secondary and tertiary renting of the vegetable stalls at wholesale market should be discouraged, as both producers and consumers are cheated and middlemen take more benefits in this system. This can be discouraged by mandatory enlisting of names of owner, staff and helper associated with the stall along with their photos in the identity card placed at stalls. Electronic system of attendance could also be provisioned for original stall owners at the market for their daily attendance.
- Maximum number of traders needs to be determined by any wholesale market, ensuring rights of the traders and enhancing quality and efficiency of the market area.

5.2.4 Social Security Aspects:

- Emergency, security and safety plans should be formulated ahead of such disasters. For instance, escape routes and fire-extinguishing mechanisms should be provisioned regarding fire hazards; whereas escape routes, open safety space should be allocated regarding earthquakes.
- Security within and outside the market should be ensured, regarding thefts and
other social outrages; through coordination among well equipped security staffs, use of CCTV cameras, law enforcements etc.

- Occupational health and security needs to be ensured among the workers/staffs of the committee.

5.2.5 Environmental Aspects:
- Comprehensive Environmental Impact Assessment should be carried out before formulating large-scale Wholesale vegetable market projects.
- Land acquisition and resettlement impacts should be addressed by the study.
- Impacts regarding air, groundwater, soil pollution, noise pollution and effluent disposal should be analyzed.
- Aspects of natural environment, heritage and landscape should also be considered.
- Mandatory rules for waste segregation, its recycle and reuse should be provisioned and implemented, using organic waste as fertilizers and feeders; and inorganic wastes should be recycled as far as possible, discouraging waste dumping culture; which will have positive environmental and economic impact.

WAY Forward
The overall goal of this study is to increase the knowledge about the condition vegetable markets in our cities. Vegetable markets are an integral part of our traditional city design as we can see much vegetable market in each neighborhood in core area; however, from the mapping survey conducted by RECPHEC, it was clear the new town plan lacked vegetable markets. It is important even now to include vegetable markets in urban planning and designs as it ensures easy accessibility to healthy food choices. RECPHEC, along with advocating to the government about the issue would contribute to support the issue through local community engagement. RECPHEC has been working with local community since many years, it is very clear that the community understands the need to address this issue. The communication bridge between the people and government needs to be strengthening for effective
results. RECPHEC is committed to fill in the gap and support the local government in ways possible.

7 References:

- The Agri Business Promotion Policy, 2063, Ministry of Agriculture and Cooperative.